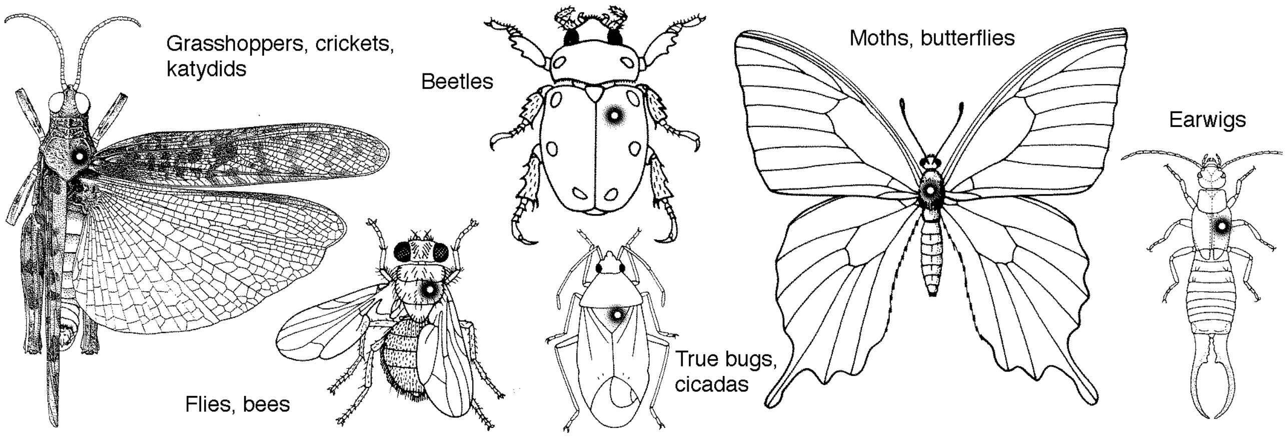
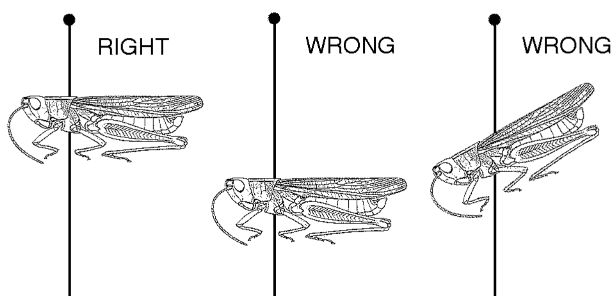
INSECT SPECIMEN PREPARATION

Your collection must be housed in a box with a foam or balsa wood bottom. This should be sturdy with a tight lid. Hard-bodied specimens are to be mounted on insect pins (ordinary household pins are not acceptable). Soft-bodied insects are preserved in alcohol in vials. Trading insects between members of the class is permitted.

PINNING



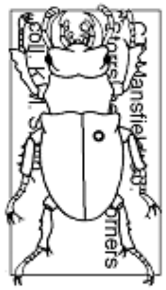
Moderate- to large-sized insects are mounted with No. 2 or No. 3 pins. The insect is mounted vertically, about 2/3 of the way up the pin. Leave 1 cm of the pin length between the specimen and the top of the pin -- room enough to comfortably grasp the pin without breaking antennae or wings. Pin location is order/taxon specific.

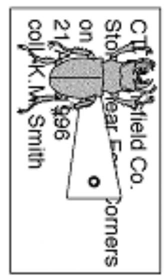


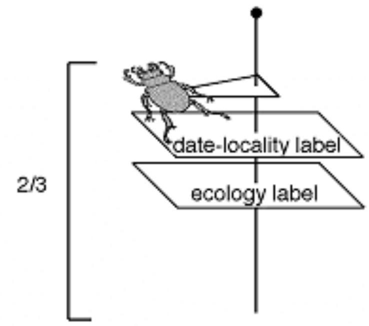
Insects are pinned through the thorax, approximately above the middle legs, and usually slightly to the right of the thoracic midline. Butterflies and moths are pinned centrally in the thorax, and their wings are spread. If an insect has gangly legs or a long droopy abdomen, support it by pinning a small piece of cardstock beneath the specimen until it dries. Then remove and discard support before adding labels.

If an insect is small enough that a pin placed through its thorax would destroy it, the specimen must be pointed. Pointing is the simplest of many techniques for dealing with small insects; it consists of gluing the specimen to a small triangle of paper which has been pinned. A point punch will be available in the lab with which you can punch a supply of points. Each point is pinned through its base with a No. 3 pin and set about 1 cm down from the pinhead. The apex of the point is bent downwards at a right angle to the rest of the point using a forceps or a fingertip. For some insects (e.g. beetles), a second, smaller bend at the very apex is also helpful. A drop of glue is

applied to the bent apex of the point, and this is touched to the **right side** of the insect (see below). Avoid getting glue on the dorsum or venter of the specimen as you may need to see structures in these areas to identify the specimen. Use Elmer's or white glue, or clear nail polish (avoid colored nail polishes).







Ideally, insects should be mounted within 24 hours after death. After this time they will become stiff due to drying out. For Lepidoptera, which have to be spread, it is best to wait about 8-10 hours after death before spreading because *rigor mortis* sets in shortly after death. From 8-24 hours after death the wings can be spread without causing damage. If specimens must be left for more than a day before pinning, they can be relaxed by placing them in a relaxing jar, a tight jar filled with moist sand or paper towels and several drops of mold retardant (phenol, naphthalene flakes, or chlorocresol), and an elevated platform to keep the specimens off the moist surface. Specimens should not be left in the jar for more than 3 days as they will get greasy; 1-2 days is usually sufficient. Remember, it is always easier to pin fresh specimens. You may use the relaxing jar in the lab, or you may make your own (we can supply the mold retardant). If you know you will not be able to work on your specimens for an extended period of time, you may keep them in the freezer until you can work on them.

PRESERVING IN LIQUID

Soft-bodied insects and non-insect arthropods (spiders, centipedes, millipedes, sowbugs, springtails, etc.) are not pinned, but are preserved in vials containing 70% ethanol. The following groups may be collected directly into 70% EtOH:

Aquatic naiads of exopterygote insects (dragonfly, stonefly, mayfly immatures) – best if collected into 80% alcohol (available in lab) because they contain much water

Terrestrial **nymphs** of exopterygote insects (orthopteroids and hemipteroids)

Adults and immatures of **soft-bodied** exopterygote insects (mayflies, aphids, thrips, mealybugs, lice, fleas, bark lice, book lice, silverfish, termites)

Most **larvae** of endopterygote insects (those that have a pupal stage in the life cycle) are so soft bodied that they will shrivel and blacken if placed directly into ethanol. These larvae should be brought alive to the lab (or to your kitchen) and killed in boiling water. To do this, bring water to the boiling point on a hotplate (a rolling boil is too hot for very soft-bodied insects). Place the insects live into the boiling water for **no more than 1 minute** (generally when they rise to the surface of the water they are adequately preserved). Remove the insects and place into 70% EtOH. For larger, very soft-bodied larvae (caterpillars, beetle grubs), the alcohol should be removed after

several days, and replaced with new 70% EtOH, as the fluids of the larva may dilute the alcohol enough to permit decomposition.

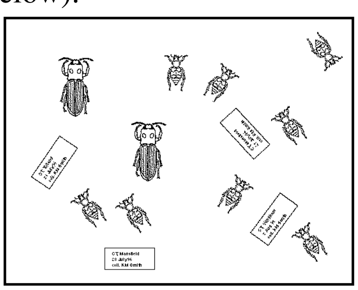
For storage, place only one species in a vial. You may place a large number of individuals in a vial, however. Labels for vials should be placed directly inside the vial, NOT taped on the outside. Use a hard lead pencil or Pigma pen to write the label. If you use the pen and india ink, hold the inked label to a hot light bulb for 30 seconds to ensure that the ink is dry (if it isn't totally dry the ink labeling will disintegrate over time). Keep vials separate from your pinned collection to avoid the possibility of a vial coming loose and destroying your pinned specimens.

PRESERVING ODONATA (DRAGONFLIES AND DAMSELFLIES)

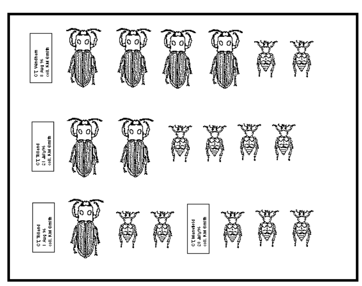
The greens and blues of dragonflies and damselflies are lost almost entirely if specimens are not immediately dehydrated. Live adults should be placed in envelopes and kept moist and cool until they can be brought to the lab. Specimens are then killed by dipping them in acetone and/or injecting them with acetone. Once the specimen has died the wings should be positioned over the body, the legs extended, and the abdomen straightened. The head should be rotated so the top faces upward, with the head to the left and the abdomen extending to the right. The specimen is then placed back into a glassine envelope and immersed in acetone for 24 hours. Adults preserved in this fashion retain much of their coloration; moreover, mitochondrial DNA can be extracted from specimens preserved in this fashion.

TEMPORARY LABELING

The moment specimens are pinned they should be grouped by locality, not taxon. At this time a temporary header label is needed until permanent labels are attached to individual specimens (or dropped into individual, sorted-to-species alcohol vials). Furthermore, avoid later ambiguity – groups of pinned specimens should be arranged in obvious rows across the box, like words on a page, with the header label at the beginning of each group and spanning the height of the row (see below).



NO



YES

Arrange your specimens in rows, each with a header label. This way you will avoid the ambiguity as to where each specimen was collected. Later, each specimen will be labeled individually.

Human memory is indeed amazing, but so is human forgetfulness, so don't underestimate your ability to lose track of when and where you collected all those bugs.

PERMANENT LABELING

Each pinned insect and **each** vial of alcohol-preserved insects must contain a label bearing date-locality information. For class collecting trips, we will provide complete labels. On request we can also provide complete labels for you individually (ask when you need more than 20 labels from one

site) and near-complete labels for your favorite collecting spots that require only addition of the date. Specimens collected in the class are often retained by the museum or used in graduate and faculty research—never mislabel a specimen with incorrect data. When in doubt, throw it out.

CT, Mansfield Co., Storrs, near Four Courners 21 Sept 1996 coll. K. M. Smith	Collected from a small bush of *Rubus* sp. Leaf chewing insect	Scarabaeidae (required) *Popilia japonica* (optional)
Date-locality label	**Ecological label**	**Determination label**

For all specimens the following information is required:

1) Place of collection -- state, county, town and/or other specifier (such as nearest highway junction), respectively;

2) Date of collection – day, month, year, respectively (abbreviate months using letters or Roman numerals – do not use Arabic numerals as day and month are ambiguous to subsequent workers: 6-8 could be June 8th or August 6th)

3) Collector's name.

The pin should pierce the label so that the long axis of the pinned insect or paper point is centered over the label. The date-locality label should be placed slightly below the specimen, low enough to give a clear view of the insect venter (and/or label info is readable) .

These widely accepted conventions minimize specimen breakage save drawer space, and allow locality information to be extracted quickly for all specimens by simply rotating each drawer counterclockwise.

Taxonomic labels: The order label should be placed on an empty pin at the beginning of each order in your collection. Family labels can be placed on separate pins (like order labels) or affixed to individual specimens (e.g., when family is represented by one or just a couple specimens) Both family and order names should be placed on the same label in alcohol vials.

PROTECTING SPECIMENS

Protection from museum pests: Certain insects, especially dermestid beetles, feed on dry insect specimens. Your collection can be kept free from these pests by placing specimens in airtight containers. If your specimens are completely dry, they can be housed in tupperware or boxes enclosed in plastic bags. Short of this, you'll need to add moth balls (paradichlorobenzene or naphthalene) or pest strips on a regular basis.

Useful guides with information on insect preparation and storage:

Borror, D. J. and R. E. White 1970. *A Field Guide to the Insects*.

Johnson, N. F. and C. A. Triplehorn 2004. *Borror's Introduction to the Study of Insects*. 7th Edition. Brooks Cole, Pacific Grove, CA. [Has keys to all North American families.]

Gullan, P. J. and Cranston P. S. 2004. *The Insects: An Outline of Entomology*. 3rd Edition. Blackwell, Oxford, UK.

Marshall, S. A. 2006. *Insects: Their Natural History and Diversity: With a Photographic Guide to Insects of Eastern North America*. Firefly Books, Buffalo, NY.

Covell, Jr., C. V. 2005. *A Field Guide to Moths of Eastern North America*. Virginia Museum of Natural History, Martinsville, VA. [Nice treatment for spreading butterflies and moths.]